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NOTES ON AMERICAN FORESTS AND FORESTRY.

BY

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In his recent message to Congress, President Roosevelt has given authoritative expression to the public interest in our forests and to the demand for their preservation. He urges an increase of the forest reservations and the management of them upon business principles. He shows his familiarity with practical conditions in asserting that forestry contemplates the perpetuation of the forests by use, and not by a withdrawal of forest resources. It appears that responsibility in this field is much divided. Protection of the reserves lies with the General Land Office. The United States Geological Survey is charged with the description of timber, while the Bureau of Forestry provides plans for forest management. The President advises that all of these duties should belong to the Bureau of Forestry of the Department of Agriculture. Commenting on the relation of forests to water supply and irrigation, it is then suggested that "forest and water problems are perhaps the most vital internal questions of the United States." Particularly should the reserves be protected from over-grazing, as by sheep, which drives away much wild game and impairs the capacity of the surface for water storage. Our highest sylvan ideals are expressed in the President's closing words:

The forest reserves should be set apart forever for the use and benefit of our people as a whole, and not sacrificed to the shortsighted greed of a few.

SCHOOLS OF FORESTRY.—In 1898, by an act of the Legislature, the New York State College of Forestry was established and placed under the supervision of Cornell University. This was the first school of this kind in America. Professor B. E. Fernow, LL.D., is Director of the College, which has three professors of forestry and several special lecturers. In addition, nearly forty members of the Faculty of the University give courses which are supplementary to forestry. Twenty-five regular students are reported, with twenty-nine from other departments taking certain courses. The work in Forestry proper occupies two years, but a four-year course, beginning with basal subjects, leads to the degree of Bachelor of the Science of Forestry. There is also a short course for

farmers, lumbermen, and other interested persons. Seminary work is done in German, forestry, literature, and lecture courses, and excursions are devoted to fish-culture and game preservation.

The State has provided the College with 30,000 acres of forest ground at Acton, Franklin County, in the Adirondack region. Here the Junior and Senior classes spend the entire spring term in practical work. This reservation, after thirty years, is to be deeded to the State, and held thereafter as a part of the forest preserve.

Some important principles of practical forest management are brought out by Director Fernow in his annual reports, which are devoted quite largely to the progress of work in the Adirondacks. The general policy contemplates some curtailment of present revenue—by leaving trees that might be cut; by careful logging, so as to save standing trees; by clearing brush and replanting certain areas. The white pine and the spruce are the most desirable timber trees; but the former has been almost eradicated, and is difficult to replace because intolerant of shade. The spruce, therefore, is to be conserved especially, and the main cutting is done upon the mature hardwoods. Spruce is tolerant of shade, and is to be developed by saving the young trees, and sufficient of the older trees, for seed.

The Director emphasizes the fallacy of the idea that forestry consists in preventing the cutting of trees. Wise harvesting and conservation are the true aims. The College forest, therefore, should afford an example of practical forest management, and be made, so far as possible, self-supporting. This is no easy task when it is remembered that part of this tract had previously been culled by the lumberman. The school, therefore, is not a heavily-endowed institution which has been given a virgin forest to manage on perfectly ideal principles. It takes a culled tract and, by thinning and planting, seeks to win steady returns and secure at the same time the development and permanence of the forest. This, as it seems to the writer of these notes, should be a sufficient answer to certain hasty reports of excessive cutting in the College forest.

One difference between this management and ordinary lumbering appears in the fact that all the top wood is worked up, and, to some extent, even the brush wood is utilized.

In 1900 the Yale Forest School, or Department of Forestry in Yale University, was founded through the munificence of Mr. James W. Pinchot and members of his family. Henry Solon Graves, M.A., is the Director. The Faculty includes professors of fores-

try, special lecturers, and various members of the teaching staff of Yale University. Regular courses now include thirty-one students, representing seventeen colleges and universities. There is also a summer school at Milford, Pa., enrolling, by the last report, twenty-seven students. Field study is provided in the Yale Botanical Garden, in certain forests near New Haven, on lands made available in the Adirondacks and White Mountains, and on the forest estates of Mr. Pinchot, at Milford, Pa. The course covers two years, and those who come to it with the Bachelor's degree from a college of high standing, or have gained equivalent training, may receive the degree of Master of Forestry. The summer course is designed for owners of woodland, forest rangers, teachers, and any others who wish information in this field.

The Biltmore Forest School is conducted by C. A. Schenck, Ph.D., at Biltmore, N. C., upon the George W. Vanderbilt estate. The school does not confer degrees, but gives a course of instruction covering twelve months in theoretical and practical forestry. The lectures cover the usual subjects, and are given during two hours of the morning. In the afternoon the young men are in the saddle, accompanying the director to any point where he is supervising work on the forest estate, which comprises 110,000 acres. Summer lectures are given in camp in the mountains. We are told that

the life at Biltmore puts the student to the test, bringing out his capabilities and answering for him the question whether or not forestry is that profession to which he is willing to devote his life.

The circular of the School defines American forestry as "the art of developing and exploiting forestal investments." Thus Dr. Schenck appears to be quite in harmony with the practical ideals set forth by the directors of the Cornell and Yale schools. Accordingly, on the Vanderbilt lands, some areas are devoted to tree growth, the higher mountain areas are given up to grazing, and the cuttings are guided by the markets and the proximity of the timber to Asheville.

PRIVATE FORESTRY IN THE ADIRONDACKS.—Director Graves of the Yale Schools is the author of Bulletin 26, Division of Forestry, dealing with Practical Forestry in the Adirondacks. Working plans were prepared for two large tracts belonging to private owners. One is Nehasan Park, the property of Dr. W. Seward Webb, and the other is the Whitney Preserve, of 68,000 acres, about Little Tupper Lake, owned by Mr. W. C. Whitney. In the latter

we have the first case of systematic forestry by a lumber company in the Adirondacks. Work in the Adirondacks is of special interest because the State has holdings of 1,100,000 acres in that region. No lumbering is allowed on these State lands, though it is stated that conservative cutting will doubtless in time be undertaken. The State can afford to leave more capital invested in standing timber than is possible with private owners. Thus, for financial reasons, such holders must often depart from the procedures of ideal forestry. We must set aside some rules used in Europe, because we cannot afford to observe them. As a sample of these concrete difficulties, the individual owner cannot bear the continuous burden of taxation, the fact being that taxes are reduced about one-half after lumbering. "Every plan of forest management in this country," says Mr. Graves, "must be in a measure a compromise between the owner of the forest and the forester."

Measures shown to be unprofitable on the two preserves described are thus enumerated—maintenance of a sustained annual yield; removal of dead and unsound trees; thinnings and improvement cuttings; permanent roads; planting, and fire lines. All these things are desirable, but cannot be done without loss. For example, a sustained annual yield is the ideal result of forest care; but such cutting is too expensive, and resort must be had to periodic lumbering.

It may be asked, what *is* practicable? In reply, it is to be said that the losses and destruction due to careless lumbering may be prevented. Thus the cutting of high stumps causes large losses, in extensive tracts. Much top wood is left to decay. This may, in part, as on the Cornell Reservation, be worked up into wood alcohol or other products. Valuable young trees, as spruce and pine, should not be used for skidways and roads. Careless crushing of small trees in felling and hauling can be avoided. A proper diameter limit is to be fixed for cutting; trees are to be left for seed, and fires may be held in check by due precaution, even though fire lines are impracticable.

OUR NATIONAL PARKS.—Under this title Mr. John Muir has brought together several papers originally published in the *Atlantic Monthly*. It is not a book of forestry, but the forest is the most frequently recurring theme in it, and is described with all of the author's enthusiasm and poetic appreciation. His avowed aim is to promote the love and preservation of the wild forests of America. An introductory general chapter on our Parks and Forest Reserva-

tions is followed by accounts of the Yellowstone Park, and of the Yosemite in particular, whose forests, gardens, animals, and streams fall, one after another, under Mr. Muir's keen eye.

He follows with the sequoia, a tree which occupies a tract 260 miles long, but is most abundant within a range of 70 miles. Something is known by all, of these great trees; but one can never read without wonder of forests in which mature specimens in good situation have an average diameter of 20 feet and an average height of 275 feet, with larger examples by no means rare, and one that is known to be at least 4,000 years old. Fifteen hundred years are needed for the maturing of the tree, and when grown it is almost indestructible, though it may be maimed by lightning and by fire.

The popular impression that the species is near extinction is scarcely true. While greatly restricted as compared with its distribution in some geological periods, it still has vitality in its Sierran home, and there is evidence of its recent extension. All that is needed to save these forests is to restrain the hand of man and let nature have her way.

The closing chapter reviews American forests broadly, and utters an ardent plea for their preservation. The volume is from the press of Houghton, Mifflin & Co., and is illustrated.

FORESTS OF ALASKA.—In the reports of the Harriman Expedition (noticed on another page of this Bulletin), Dr. B. E. Fernow has given a short sketch of Alaskan forests. They are a northern extension of the woodlands of the Pacific border; and, indeed, the only true forest is on the mainland and islands of the shore belt. The Yukon basin, or interior, is mainly open country, with islands of stunted forest. Spruce, birch, aspen, and poplar are among the trees of these inland forests, which are quite unlike those of the coast and more resemble those of the Atlantic region of the northeast. The poor development is attributed to the frozen subsoil, and the extremes of temperature, from above 100° in summer to -60° or below in winter. Important as these woods will be for local use, carelessness has already led to some destructive fires.

The coast forest deteriorates in going north from Washington and British Columbia. It ends about Cook Inlet and on Kadiak Island, but with evidence of recent migrations in that region. The Alaskan peninsula and the islands to the west do not seem to be unfavourable for forest growth. But during the dry season, when alone the cones release their seeds, the winds are not in the right

direction to populate those regions. The Alaskan forest has no Douglas spruce, almost no pines, and no great firs. It consists, mainly, of Sitka spruce and coast hemlock; the latter predominating. The timber-line near the shore varies from 1,800 to 2,400 feet, but is higher in some interior situations. Spruces six feet in diameter and 125 feet in height were measured about Sitka, but the trunks are knotty and poor. Some deciduous trees occur on river bottoms and along shores, including cottonwoods, willows, and alders. The "astonishing indifference" of the trees to glaciers close at hand is observed, and woody vegetation is reported as growing on the morainic covering of some ice streams—a fact of which Russell has described the finest illustrations, from the border of the Malaspina glacier.

The reserves of timber in Alaska are not, as some have reported, of large value, save for local use, both because of poor quality and difficult transportation. The Yukon and White Pass Railroad is built with imported ties, although it crosses a forested region.